

- Applicant revision to Stormwater Management Plan (7-10-09)

### Description of the Revisions

There are several changes being made to the plans since the previous submittal:

1. Shift in Turbine 4 and 5 location and the associated road re-alignment between Turbines 4 and 6.
2. Addition of two permanent meteorological towers and associated access roads near Turbines 4 and 7.
3. Temporary access road widening near stations 16+00, 21+00, 35+00, and 45+00.
4. Relocation of the O&M facility and the project collector substation to the same location adjacent to Route 120.

### Summary of Stormwater Calculations

**Revision 1** – Turbines 4 and 5 have been shifted to reduce the likelihood of wake effect between the turbines. The redesign does not require that the pad or clearing for Turbine 4 be moved, only the turbine location within the pad is shifting. The previously submitted turbine pads for Turbines 4 and 5 and the road alignment between Turbines 4 and 6 had buffers to treat the phosphorus export from the road. When the turbine relocations and road realignment was designed, the buffers that provided treatment for the original layout were able to be shifted with the new realignment. These shifted buffers provide the same amount of treatment as before.

**Revision 2** – Two permanent met towers have been added near Turbines 4 and 7 along with the access roads to the towers. These towers are within the watershed of Ellis Pond and therefore require phosphorus treatment. Three buffers were added to treat the phosphorus export from the access roads. Attached are the revised phosphorus calculations spreadsheets showing what area was treated, the type of best management practice (BMP) and the size for each. There are 0.08 acres that are not able to be treated due to steep slopes, so the total acreage of development (TA) was increased to compensate for this untreated area. Even with the increased development area, the project still does not exceed the "small watershed threshold" as defined by MaineDEP. See the project plans (Exhibit 1) for the revised TA boundary.

**Revision 3** – The proposed temporary road widening near stations 16+00, 21+00, 35+00 and 45+00 is necessary to allow component vehicles the necessary room required to negotiate horizontal curves and will only be used during construction, under 1 year. These areas will be allowed to revegetate once the turbines are at their locations. Erosion and sediment control has been revised in these areas to ensure the temporary disturbance will not cause erosion or sediment to leave the project site.

**Revision 4** – The O&M building and project collector station have been relocated to streamline electricity delivery and to reduce operating costs. The relocated O&M building and the two electrical substations must meet the BMP and flooding standard.

The applicant proposes to meet the required **BMP standard** by doing the following:

Using two underdrain soil filters to treat the runoff from the proposed site will provide both quality treatment and temperature control for the runoff. A portion of the existing site naturally drains to a stream therefore temperature control must be provided. Following the proposed development much of this area will continue to drain to the stream. The proposed treatment methods collect runoff from 84.64% of the linear impervious surface and 87.56% of the developed linear area, and 96.00% of the nonlinear impervious surface and 95.24% of the nonlinear developed area, which exceeds the DEP requirements for treatment. As per the regulations, at least 75% of the linear project and at least 50% of the developed area of the linear portion of the project must be treated. The nonlinear impervious area of the project must have 95% treatment and nonlinear developed area must meet at least 80% treatment. Attached is a spreadsheet that summarizes the method

of treatment, with their sizes, the contributing area of impervious surface and developed area, and the percentage of the project treated by each treatment system.

The applicant proposes to meet the **Flooding standard** as follows:

The flooding standard will be addressed by storing runoff volume using detention basins. These structures are designed to collect, store, and control the stormwater runoff. The structures have been designed to accommodate the 2-, 10-, and 25-year storm events. As part of the flooding standard the runoff at each of the property lines must meet or be less than the predevelopment flows. The overall storm water management system is designed to minimize any adverse impact on areas downstream from the site. There were three analysis points for the site, one was the back yard, second was the abutter's front yard, and the third was the culvert associated with the stream. These areas were a specific concern with regards to flooding. See the summary chart below for the peak flow rates.

Summary of the Peak Flow Rates

	Subcatchment		Flow (cfs) from Hydrocad		
	Property Line	#	2-year	10-year	25-year
PRE	Back Yard	1	23.67	50.93	63.64
POST		4, 6, 8, 11	18.74	40.40	50.55
CHANGE			-4.93	-10.53	-13.09
PRE	Front Yard	3	1.81	3.67	4.52
POST		1, 2, 5, 7, 9, 10, 12, 13	1.81	3.11	3.68
CHANGE			0.00	-0.56	-0.84
PRE	Culvert	2	4.67	9.53	11.76
POST		3	3.49	7.42	9.24
CHANGE			-1.18	-2.11	-2.52
PRE	Total	1, 2, 3	29.40	62.70	78.17
POST		All	21.87	47.38	59.34
CHANGE			-7.53	-15.32	-18.83

Attached are all of the pond calculations, TR-20 hydrology report for the area contributing to the pond, outlet calculations, emergency weir calculations, and stormwater quality and quantity calculations.

**Section 14**  
**Basic Standards**

## 1.0 Introduction

The following plan has been developed to provide a strategy for controlling sedimentation and erosion from the Record Hill Wind Project (Project) during and after construction of roadways, staging areas, and turbine pads. This plan is based upon sound conservation practices such as those outlined in the *"Maine Erosion and Sediment Control BMPs Manual"* by the Maine Department of Environmental Protection (MDEP), dated March 2003, and recent experience constructing the Stetson Wind Project. Please refer to the Erosion Control Drawings and Details included within the Drawing Set for more detailed information (see Exhibit 1, sheets C-115 to C-124 and C-201). For additional information on buffers the contractor shall reference Stormwater Management for Maine Volume III January 2006: BMPs Technical Design Manual Chapter 5, Vegetated Buffers.

Record Hill Wind LLC (RHW) is proposing to construct a series of wind turbines on Partridge Peak, Flathead Mountain, and the associated ridgeline in the Town of Roxbury, Maine. The Project will include the construction of an access road to the turbines and the construction of turbine pad areas. Additionally, an Operations and Maintenance (O&M) building will be constructed. Erosion and sedimentation control during the construction of roadways and turbine pads is found on sheets C-115 to C-124 of the drawings. Erosion and sedimentation control during the construction of the O&M building and substation facilities is located on sheet C-201. The location of the facility is shown on the Project Site map attached in Section 1 of the application. The Project scope, locations and methods of erosion control practices and measures required for the turbine construction are found in Exhibit 1.

### 1.1 Stormwater Management Measures

Additional measures may be required to protect new stormwater conveyance or management systems. It is also very important to protect new ditches, and culverts with special measures such as stone check dams, or similar measures to prevent sediment from entering conveyance systems and being transported long distances or to off-site locations.

### 1.2 Additional Permits

Work requiring additional permits, including local permits from towns or municipalities, shall be performed in accordance with all applicable standards therein.

## 2.0 Construction Calendar

### 2.1 General

Construction of the Project is expected to begin shortly after obtaining approvals and permits. It is likely that the construction of the roadways and turbine facilities will be fully complete in 2010. However, unanticipated delays, scheduling problems, or weather conditions may significantly alter these dates. The Contractor should give special attention to the sections pertaining to fall and winter construction, as well as to sensitive areas and requirements for temporary seeding, dormant seeding and mulching.

### 2.2 Definitions

The following definitions are terms commonly used throughout this report.

*Seasons* – The following dates define the seasons as referred to herein:

<u>Seasons</u>	<u>Dates*</u>
Winter	November 1st to April 15th
Mud-Season	March 16th to April 30th *
Spring	May 1st to June 14th *
Summer	June 15th to September 15th *
Fall	September 16th to October 31 <sup>st</sup>

\*Seasonal dates may vary according to weather. The Engineer or MDEP must approve any changes in these dates.

*Critical Areas* – Specific areas identified herein or subjected to significant erosion problems as observed in the field prior to, during or following construction activities, such as areas with steep slopes or channels in excess of 8 percent, newly graded slopes, highly erodible soils that will be exposed for more than one month, or bare soils exposed during late fall and winter when no vegetation can grow.

*Erosion and Sedimentation Controls* – Defined as the installation of silt fence, hay bales, erosion control berms, rip-rap, mulching, erosion control matting or netting, check dams, inlet protection, construction entrances, diversions, level spreaders, and any other temporary or permanent measures required herein.

*Clearing* – Includes cutting and removing of over-story vegetative cover. It does not include grubbing. Limited cutting, thinning, use of heavy equipment and other clearing restrictions will apply to sensitive areas and wetland crossings.

*Grubbing* – The removal of grass, roots and scrub required to begin earthwork. Grubbing is the initial clearing action that exposes soil to erosive forces (wind, rain).

*Interim Period* – A period of time that an unvegetated area sits un-worked, awaiting the next phase of work.

*Earthwork* – Consists of the movement of soil by mechanical means including excavation, filling, grading, trenching, and shaping.

*Temporary* – As used herein shall refer to the use or placement of erosion or sedimentation controls, seeding or other measures intended to be either removed, replaced, reworked, reseeded, or followed with permanent measures.

*Permanent or Final* – As used herein shall refer to the use or placement of erosion or sedimentation controls, seeding or other measures, which will remain through final project completion.

*Acceptance* – As used herein shall mean verification by Owner and/or Engineer that the specific erosion control measure or device to be accepted is adequately constructed, performs satisfactorily as intended and is complete. Acceptance of a measure or device by Owner or Engineer shall be based upon visual observations and inspection and is not a warranty of compliance, compaction, structural integrity, workmanship or other construction related or qualitative factors that may require testing or other means of certification of compliance.

*Engineer* – As used herein shall mean a representative of James W. Sewall Co. and/or an engineer, representative or inspector designated by MDEP, or person designated by Owner as the Construction Site Engineer.

*Buffer strips* – Natural, undisturbed strips of natural vegetation or reseeded strips of close-growing vegetation adjacent to and downslope of developed areas. Reference: Stormwater Management for Maine Volume III January 2006: BMPs Technical Design Manual Chapter 5, Vegetated Buffers.

- Buffer with stone bermed level lip spreaders: This buffer is used for larger, developed areas and uses a level spreader to create sheet flow onto the buffer.
- Buffer adjacent to the down hill side of a road: This buffer is used for flow from a roadway when it directly enters the buffer as sheet flow.
- Ditch turn-out buffer: This buffer is used to divert roadway runoff collected in a ditch into a buffer as sheet flow.

### 2.3 Schedule of Activities

The following activities, erosion control measures, or other items are required for the construction of this project or require specific measures or scheduling of activities to be conducted or restricted during the various construction seasons as herein defined above.

*Critical Areas* – Work proposed in the defined critical areas may be conducted all year. However, to the extent practical, erosion control measures for defined critical areas should be installed during summer or fall in advance of construction, in or adjacent to critical areas anticipated or scheduled in the winter and mud season. Certain problem areas may become “critical areas” during the course of construction. Areas observed to be experiencing significant erosion problems shall be deemed critical areas and shall be stabilized with appropriate erosion control measures immediately prior to progressing with work in these areas as directed by Engineer.

*Erosion and Sedimentation Controls Installation* – Erosion control installation may occur all year long, except that such measures shall be installed prior to commencement of disturbance activities related to each erosion control measure. However, to the extent practical, erosion control measures should be installed during summer or fall in advance of construction anticipated or scheduled in the winter and mud season. See Drawings and Details for locations and installation procedures.

*Clearing* – Ground conditions permitting, clearing may occur at any time of the year.

*Road Construction* – This construction may occur in the spring, summer, and fall seasons. It may be allowed in the winter season. However, the winter construction schedule must be followed. The following requirement for access road construction will be adhered to in order to prevent erosion from taking place during construction:

- While the entire road system may be cleared in one effort, the access road will be constructed in segments where each segment is grubbed, constructed and protected prior to clearing the next segment. This construction sequence is intended to prevent large areas from being exposed, without temporary stabilization, to erosion during major rain events. A segment is defined as an area cleared and grubbed. Each segment shall not exceed a length that can be stabilized in a one-week period. Multiple segments in different areas of the project may be constructed concurrently.

## 3.0 Erosion Control Measures

### 3.1 General

The construction of this Project may require or incorporate the following measures or practices as needed or applicable. Such measures, where indicated on Drawings, shall be implemented as shown, or as deemed necessary by the Engineer. Additional measures not shown on Drawings may be required as specified herein or requested by the Engineer, as needed, in order to ensure the protection of resources or off-site properties.

*Straw Bales* – Shall be installed along the contours in the locations and as detailed on the Drawings. Straw bales may be required in addition to silt fencing or other measures in sensitive areas as shown on Drawings. Bales are to be embedded four inches into the existing soil and staked with ends tightly abutting adjacent bales. Where staking and embedding of straw (or hay) bales is impractical due to excessive roots, ledge, or other construction hazards, straw bale barriers may be substituted with erosion control mix berms where approved by Engineer.

*Erosion Control Mix Berms* – May be installed in locations that do not have a concentrated flow.

*Silt Fence* – Shall be installed along the contours in the locations and as detailed on the Drawings. Silt fence may be required in additional or other locations, not indicated on Drawings, as warranted or



determined by field conditions or as directed by Engineer. Silt fence may also be required in addition to straw bales or other measures in sensitive areas as shown on Drawings. Where staking and embedding fabric is impractical due to excessive roots, ledge, or other construction hazards, silt fence may be substituted with erosion control mix berms or placement of six inches of suitable non-organic material along fabric flap on upslope side of fence, in lieu of burying fabric in trench, only where approved by Engineer.

*Storm Drain Inlet Protection* – Temporary storm drain drop inlet or curb inlet barriers shall be used on all storm drain inlets unless otherwise indicated on Drawings to prevent sediment from entering the storm drain system during construction. The intent is to provide a continuous sediment filter around the storm drain inlets. The filter may be constructed of silt fence, crushed stone, gravel, concrete blocks, hay bales, geotextiles or other proprietary products as detailed on the Drawings.

*Sediment Barrier Berms* - A sediment barrier is a berm installed across or at the toe of a slope and down gradient of disturbed earth. Its purpose is to intercept and retain small amounts of sediment from disturbed or unprotected areas of limited extent. (For other sediment barrier use, see MDEP BMP handbook section 14.0.) The sediment barrier is used where:

- Sedimentation can pollute or degrade a wetland or any other water resource.
- Sedimentation will reduce the capacity of storm drainage systems or adversely flood adjacent areas
- The contributing drainage area does not exceed 1/4 acre per 100 ft of barrier length; the maximum length of slope above the barrier is 100 feet; and the maximum gradient behind the barrier is 50 percent (2:1). If the slope length is greater, additional measures such as diversions may be necessary to reduce that length.
- Sediment barriers cannot be used in areas of concentrated flows. *Under no circumstances* should erosion control mix sediment barriers be constructed in streams or in swales.

*Temporary Mulching* – Shall consist of spreading of straw (or hay) mulch over bare or disturbed areas. It shall be applied at the rates described herein. It will be substituted by matting where necessary or as specified herein. Alternate mulch materials or methods such as hydro seeding may be used only when approved by the Engineer. Mulching shall be substituted with matting in locations where it has proven to be ineffective in the field. Mulching rates shall be doubled where requested by Engineer based on observations in the field or in locations undergoing winter construction.

*Matting* – Shall consist of straw, coconut or excelsior sandwiched between photodegradable netting. Matting may be substituted with sod where desired. Netting over straw mulch may be substituted for matting only when approved by Engineer. Matting shall be used: (1) where indicated on Drawings; (2) in the base of swales with moderate slopes and erosive capability. High velocity ditch lining or geotextile soft armor may be required in steep ditches (> 8%) or areas receiving significant concentrated flows; (3) on steep slopes where rilling may occur or where mulching has proven to be ineffective in the field; or (4) where straw mulch has been determined to be ineffective based on observations made in the field or as directed by the Engineer.

*Riprap* – Shall be used in swales, steep slopes, pond spillways, and outlets as shown on Drawings to protect soils from excessive flow velocities. It shall be of the size and depths specified on the Drawings. Riprap may be required at locations where revegetation matting, high velocity ditch lining or soft armor is proven to be ineffective in the field as directed by Engineer.

*Flared End Sections* – Shall be installed on the inlets and outlets of culverts, field inlets and storm drain outlets where indicated on Drawings. Rip-rap inlet or outlet protection may be required in addition to flared end sections in locations where indicated on Drawings and in locations where flared end sections have proven to be ineffective in the field as directed by Engineer.

*Outlet Protection* – Riprap outlets (aprons or plunge pools) shall be provided in locations where indicated on Drawings and Details, and in locations where flared end sections have proven to be inadequate to



prevent scouring at the pipe outlet in the Field, as directed by Engineer. The riprap shall be the same size as that specified on the Drawings.

*Stone Check Dams* – Shall be installed in existing and proposed swales or at culvert inlets as shown on the Drawings. These check dams serve to reduce flow velocities in swales thus helping to reduce rilling. Check dams shall be constructed with a six-inch tapered spillway at the center as shown on Details to prevent breaching and scour at the outer edges along the sides of the ditch.

*Level Lip Spreader* – Unless otherwise specified or indicated on Drawings, level lip spreaders will generally consist of 25-foot long, 6-inch to 12-inch deep, stone-lined ponded areas discharging over a level berm through a well vegetated buffer area. These spreaders will function to disperse channelized flow into shallow sheet flow. Construction and length of level lip spreaders shall be as detailed on the Drawings.

*Construction Entrance* – A crushed stone-stabilized construction entrance will be installed wherever construction traffic will enter the public road system. The size, type, and locations of these shall be as shown and detailed in the Drawings. Entrances shall be constructed with a 6-inch minimum layer of 2-inch stone. Stone entrance shall be placed on geotextile fabric and shall include a minimum 10-foot by 10 foot taper on both sides of the entrance to allow for turning vehicles.

*Dust Control* – Contractor shall take necessary steps to prevent blowing and airborne movement of dust from exposed soil surfaces. Maintaining natural or temporary vegetation and or mulching shall be used where practical. Mechanical sweepers or washing of pavement shall be used where necessary to prevent and remove dust buildup on paved surfaces. Regularly traveled soil surfaces shall be maintained to minimize dust by periodically moistening bare areas with adequate water to prevent dust. Calcium Chloride solution spray should be used in areas experiencing significant dust problems and to reduce frequency of watering. Repetitive treatment shall be applied as necessary to accomplish adequate dust control (refer to Section 17.0 in the "*Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices*" manual).

*Permanent Mulching and Revegetation* - Permanent mulch is long-term cover that provides a good buffer around disturbed areas. Permanent mulching with erosion control mix can be used as a permanent ground cover, as an overwinter stabilization mulch, or left to naturalize and revegetate to near natural conditions. It is not used to support grass vegetation, but legumes or woody vegetation may be established if allowed to revert to natural conditions. Permanent mulch must not be used in areas of concentrated water flows, and any evidence of groundwater seepage on slopes may require the erosion control mix to be replaced with riprap. Erosion control mix can be manufactured on or off the project site. It shall consist primarily of organic material, separated at the point of generation and may include shredded bark, stump grindings, composted bark, or flume grit and fragmented wood generated from water-flume log handling systems. Wood chips, ground construction debris, reprocessed wood products, or bark chips will not be acceptable as the organic component of the mix. Erosion control mix shall contain a well-graded mixture of particle sizes and may contain rocks less than four inches in diameter. Erosion control mix must be free of refuse, physical contaminants, and material toxic to plant growth.

#### **4.0 Erosion Control Execution**

##### **4.1 General Construction Phase**

The following general practices will be used to prevent erosion during construction of this project. Refer to Drawings and Details for applications, locations and installation methods. If Contractor is unclear regarding the use, location, installation, intended performance, or maintenance of any prescribed erosion control measures, Contractor shall refer to the "*Maine Erosion and Sediment Control Handbook for Construction: BMP*" Manual for detailed procedures or contact Engineer for assistance.

NOTE: Locations of silt fence/hay-bale barriers are shown on Drawings for general purposes only to indicate the intent. Final locations should be modified based on actual field conditions and as site conditions warrant. Such field changes or modifications shall be approved by the Engineer.

*Following clearing* – Only those areas under active construction shall be left in an untreated or unvegetated condition.

*Erosion Control Installation* – Prior to the start of grubbing, silt fence, haybales, erosion control mix berms, stabilized construction entrances, or other appropriate measures shall be installed adjacent to construction areas, around catch basins, at the toe of slopes and in areas as shown on Drawings, or as otherwise required to protect against any construction related erosion. Immediately following construction of culverts and swales, stone check dams, and ditch linings shall be installed, as shown on the Drawings.

*Topsoil* – Topsoil will be stockpiled on-site when necessary in areas that have minimum potential for erosion, such as flat slopes or on-site borrow pits, and will be kept as far as possible from existing drainage areas. Stockpiles expected to remain longer than 15 days shall be encircled with haybales, erosion control mix berms, or silt fence at the down gradient sides of the stockpile; and mulched with a second application of hay mulch and anchored with biodegradable netting if deemed necessary by Engineer.

*Temporary Seeding and Mulching Schedule* – During construction, all disturbed areas shall adhere to the schedules specified in TABLE 1 and SEEDING SCHEDULE below: (Note: refer to Section 4.02-Permanent Seeding and Mulching Plan for permanent seeding and mulching requirements.).

The Contractor shall be responsible for monitoring daily weather reports when working in the identified sensitive areas and for monitoring weekly reports in other areas. Contractor shall adjust the work schedule in anticipation of rains and shall stabilize the site as indicated or required.

All completed areas that have been loamed and/or finish graded shall be permanently reseeded in accordance with Section 4.02-Permanent Seeding and Mulching Plan.

Temporary mulching and/or seeding shall commence immediately following initial fine grading of any area expected to remain bare for an interim period of more than 30 days (7 days for sensitive and critical areas). Stabilization or seeding requirements shall be determined in accordance with Table 1 and shall be implemented at the beginning of the expected interim period. In no case shall any bare areas remain untreated for more than 30 days (7 days for sensitive and critical areas).

Interim periods for sensitive and critical areas are indicated in the following tables. However, exposed or bare soil in these areas shall be mulched at the completion of work, each day, if significant rainfall is predicted or eminent.

Mulch application rate shall be doubled during winter construction. Where practicable, mulch should be applied at the end of each days work for areas that have been fine graded or if snow is predicted or eminent. In no case shall any areas be left bare for more than 15 days.

Permanent seeding shall not be attempted during the fall or winter seasons (after September 1) unless otherwise approved by Engineer. Should seeding be approved by Engineer during winter season, the Contractor shall follow procedures for dormant seeding. Refer to Section 4.02-Permanent Seeding and Mulching Plan for dormant seeding requirements. However, vegetation must be inspected and reseeded by Contractor as necessary in the following spring (April 15th) to ensure good vegetative cover. Acceptance of dormant seeding shall not occur until after May 1, in the following Spring.

Temporary seeding and mulch shall be inspected and maintained or repaired weekly. At a minimum, 75 percent of the soil surface should be covered by vegetation. If any evidence of erosion or sedimentation is apparent, repairs shall be made and other temporary measures used in the interim

(e.g., mulch, filter barriers, check dams). Mulch shall be reapplied as necessary to completely cover soil.

Maximum Expected Interim Period* - (Days)	Temporary Mulching (Hay)	Temporary Seeding
0-7 (0-2)	None	None
7-30 (2-14)	2-bales/1000 sq.ft	None
30-60 (14-30)	2-bales/1000 sq.ft.	(Per temporary seeding schedule)
More than 7 days during winter season	4-bales/1000 sq.ft.	Dormant seeding only
* Values in parentheses indicates interim period for sensitive & critical areas.		
** Mulch application rates shall be doubled for winter construction		

TEMPORARY SEEDING SCHEDULE			
Seed	Seeding Rate (Lbs/1000 sq. ft.)	Seeding Depth (Inches)	Recommended Seeding Dates
Annual Rye Grass	0.9	1/4	4/1 to 7/1
Sudan Grass	0.9	1/2	7/1 to 8/15
Perennial Rye Grass	1.8	1/4	8/15 to 9/15
Winter Rye Grass	2.6	1	9/15 to 10/15
Dormant Seeding	3.5	1	10/15 to 3/31
50% Winter Rye	(2.6)		
50% Annual Rye	(0.9)		

**Grading** – Grading will be held to a maximum 2:1 slope where practical. Greater slopes may be used in ledge cut or stable material. Finish-graded areas shall be stabilized with permanent seeding and mulching or other accepted means immediately after final grading is complete. If final grading will not be completed immediately, refer to the Temporary Seeding and Mulching Schedule. It is understood that immediately means within five days of the completion of work. Refer to *Permanent Seeding and Mulching Plan*, herein. See Contract Specifications for additional, more specific, permanent seeding requirements.

**Construction Traffic** – Construction traffic will be directed over the stabilized construction entrances and proposed roads. Any areas subject to rutting will be stabilized immediately. The crushed stone construction entrances shall be maintained by the addition of more crushed stone as needed as the voids become filled. The public roadway shall be swept daily should mud be tracked onto it.

**Winter Construction** – For any work proposed during the winter season, the Contractor shall adhere to the following practices.

- A plan and schedule of activities shall be submitted to the Engineer and approved prior to any work being done.
- The interim period for any exposed area shall be limited to 7 calendar days.
- Where required and approved by Engineer, installation of silt fence may be modified from detail on Drawings to substitute six inches of suitable non-organic material over the bottom of the silt fence in lieu of trenching and backfilling fabric.

- Mulching and seeding rates shall adhere to the Temporary Seeding and Mulching Schedule, (Section 4.01.d.). *Note that all mulching rates shall be doubled as shown in the above table and shall follow the sensitive area schedule.*
- Permanent seeding shall not be attempted by Contractor during winter season unless otherwise approved by Engineer.

**Monitoring Schedule** – The Contractor shall be responsible for installing, monitoring, maintaining, repairing, replacing and/or removing the temporary erosion and sedimentation controls as specified herein or directed by the Engineer, or shall appoint a qualified subcontractor to do so, as follows:

- The Contractor or approved designated Inspector shall perform weekly inspections of the site until the site is stabilized. Inspections may be performed at a bi-weekly schedule while work has abated for more than one week.
- Maintenance measures will be performed as needed during the entire construction cycle. After each rainfall, and *prior to* predicted significant rainfall events ( $> 1"$ ), a visual erosion controls inspection will be made by the Contractor to insure their continuing function as designed.
- Stone check dams, hay bale barriers, drop inlet barriers, erosion control mix berms, silt fence and mulch shall be inspected and repaired once a week or immediately following any significant rainfall. Sediment trapped behind these barriers shall be removed when it reaches a depth of 6 inches (or 1/2 the height of the dam for check dams) and redistributed to areas undergoing final grading.
- Near completion of the construction and after the site is reseeded and stabilized, the Contractor shall inspect, clean, maintain, repair, restabilize or revegetate all drainage structures, storm drains, culverts, level spreaders and ditches prior to acceptance by the Owner.

**Permanent Seeding and Mulching Plan** – The following general practices will be used to re-establish final vegetation.

- Loam will be spread over disturbed areas and graded to a uniform depth and a natural appearance. Loam shall be as specified or approved by the Engineer.
- Final seeding shall be completed immediately (within 7 days) following final topsoil and loam grading. All final fertilizing and seeding shall adhere to the Specifications unless otherwise approved by the Engineer. Refer to Specification Section 02930.
- Areas shall be mulched immediately after seeding. Immediately upon first signs of any evidence of significant erosion occurring, Contractor shall repair and mulch all such areas until area is stabilized. Mulching shall consist of hay mulch, hydro-mulch, or any suitable substitute deemed acceptable by the Engineer. Mulching shall be monitored according to the monitoring schedule. Should mulching prove to be ineffective, then netting or matting shall be used in its place.
- Straw mulch shall be applied at the rate of 2 tons per acre (90 pounds or 2 bales/1,000 square feet) unless otherwise specified.
- Hydro-mulch shall consist of a mixture of asphalt, wood fiber or paper fiber and water sprayed over a seeded area. Hydro-mulch shall not be used during the fall, winter or mud season unless approved by the Engineer.
- Construction shall be planned to the extent possible to minimize the need for seeding during the fall, winter or mud season. Dormant seeding shall not be used unless approved by Engineer. Should seeding be necessary between these dates, the following procedure shall be followed.
  - Only unfrozen loam shall be used.
  - Loaming, seeding and mulching will not be done over snow cover. If snow exists, it must be removed prior to placement of seed.
  - No permanent seeding will be done during fall, winter or mud season unless specifically approved by the Engineer. If attempted, the normal seed application rate shall be doubled. Reseeding in spring by Contractor will be required in all areas with insufficient growth.
  - Where temporary seeding is required, the rates specified in the Temporary Seeding and Mulching Schedule shall be adhered.

- Fertilizing, seeding and mulching shall be done as soon as possible after the loam is spread. Winter mulch rates shall apply as specified in the temporary seeding and mulching schedule.
- On slopes greater than 3:1, straw matting or excelsior matting may be substituted for mulch. Biodegradable netting over mulch may be applied where required by the Engineer.

Following final seeding, the site will be inspected every 30 days until 80 percent cover has been established. Reseeding and mulching shall be carried out in areas where inadequate catch is observed until adequate growth is established in seeded areas, as agreed upon by the Engineer. The Contractor may be required to reseed during the following spring subsequent to winter or fall construction and seeding in order to provide 80 percent vegetative cover as required for Acceptance by Owner.

#### 4.2 Erosion Control Removal

Removal of temporary erosion control measures shall be the responsibility of the Contractor. Erosion controls shall remain in place and maintained by the Contractor until all related construction is complete and the area is stable.

An area is considered stable if a 90 percent cover of grass has been established or riprap or other permanent measures are in place and functioning properly.

Haybales and silt fence shall be removed once the areas upstream are stable. The haybales and silt fence shall be disposed of legally and properly off-site. Sediment trapped behind these controls shall be distributed to an area undergoing final grading and Graded in an aesthetic manner to conform to the topography, and fertilized, seeded and mulched in accordance with the rates previously stated.

The sediment trapped behind/around/in stone check dams, perforated risers, and sedimentation basins, shall be removed and transported off-site, or to an upslope area undergoing final grading. The sediment trapped by these devices shall not be regraded locally since they exist in drainage ways.

The rip-rap and stone from the check dams and risers may be either removed or regraded in an aesthetic manner that does not inhibit flow or create erosion.

Once the trapped sediments have been removed from the temporary sedimentation devices, the disturbed areas must be loamed (if necessary), fertilized, seeded and mulched in accordance with the rates previously stated.

#### 5.0 Conclusion

If constructed in conformance with the Project Drawings and the Erosion and Sedimentation Control Report, herein, the Project should not result in any significant erosion or sedimentation either on or off the site.



**Site Location of Development**  
**TECHNICAL REVIEW MEMORANDUM**  
*Bureau of Land and Water Quality*

TO: **Beth Callahan, Project Manager**  
FROM: **David A. Waddell -- Division of Watershed Management**  
DATE: **July 28, 2009**  
RE: **Roxbury – Record Hill Wind Project**

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**APPLICANT:** Record Hill Wind, LLC

**DEP#:** L-24441-24-A-N, L-24441-TF-B-N

**Town:** Roxbury

**Engineer who prepared application:** Sewall Corporation

**Parcel Size:**

**Site Description:** Actively managed forest land with steep slopes

**Project description:**

**Size of new impervious area:** 17+ acres

**Size of new developed area:** 17+ acres

**Watershed (waterbody):** tributaries to the Swift River, Meadow Brook, and Ellis Pond

**Watershed type:** other, other, sensitive / threatened, and sensitive / threatened respectively.

**PLANS USED FOR REVIEW:**

Pre-development: Plan sheets 12-1 and 12-2, "Predevelopment Plan," dated 11/24/08

Post-development: Plan sheets 12-3 and 12-4, "Postdevelopment Plan," dated 7/08/09

Erosion and Sediment Control Plans: Plan sheets C-114 to C-122, "Sedimentation and Erosion Control Plan," dated 7/08/09

Note: Other plans may have been reviewed that are not noted here.

**STORMWATER MANAGEMENT**

The applicant is proposing a 50.6 Mega Watt wind power generating field of 22 towers called the Record Hill Wind Project. This project lies within the watershed of tributaries to the Swift River, Meadow Brook, and Ellis Pond. This proposed project will create 18.43 acres of impervious area. Since the proposed project includes more than 3 acres of structure area it triggers the site location of development act and must meet the Basic, General, and Flooding Standards. Under the General Standards the applicant is applying the phosphorus methodology to address impacts to the above Lakes and Ponds. As such, the applicant is required to use the Phosphorous Methodology outlined in "Phosphorous Control in Lake Watersheds: A Technical Guide to Evaluating New Development" to assess the development. This project is being reviewed under the 2006 Stormwater Management rules and the design and sizing of the proposed BMPs for this project are based on the "Stormwater Management for Maine" January 2006.

Stormwater quality treatment will be achieved with various roadside, turnout, level spreader buffers and two grassed underdrained soil filters.

Stormwater flooding mitigation will be achieved with lengthening flow paths and disconnecting impervious area through the use of buffers and by two small detention areas.

The following comments need to be addressed:

**BASIC STANDARDS:**

**Note:** As always the applicant's erosion control plan is a good starting point for providing protection during construction. However, based on site and weather conditions during construction, additional erosion and sediment control measures may necessary to stop soil from leaving the site. In addition, other measures may be necessary for winter construction. All areas of instability and erosion must be



*repaired immediately during construction and need to be maintained until the site is fully stabilized or vegetation is established. Approval of this plan does not authorize discharges from the site.*

**Proposed Condition:** Due to the level of disturbance, steep slopes, and its close proximity to on site water resources, a site inspector reviewing erosion and sedimentation control is suggested for this project. The applicant will retain the services of a professional engineer to inspect the erosion and sedimentation controls on the site. Inspections shall consist of weekly visits to the site to inspect erosion and sedimentation controls from initial ground disturbance to final stabilization. If necessary, the inspecting engineer will interpret the erosion and sedimentation control plans and notes for the contractor. Once the site has reached final stabilization, the inspecting engineer will notify the department in writing within 14 days to state that the construction has been completed. Accompanying the engineer's notification must be a log of the engineer's inspections giving the date of each inspection, the time of each inspection, and the items inspected on each visit.

### **GENERAL STANDARDS**

#### **Non-linear Portion**

Percent of Impervious Treated: 96% (95% required)

Percent of Developed Treated: 95% (80% required)

#### **Linear Portion**

Percent of Impervious Treated: 82% (75% required)

Percent of Developed Treated: 82% (50% required)

(Note: the above table is subject to change with response to comments.)

### **Phosphorus Standards**

#### **Phosphorus to Ellis Pond**

Per Acre Phosphorus Budget (PAPB):	0.041 lbs / acre / yr
Project Acreage (eligible for allocation)(A):	155.35 acres
Project Phosphorus Budget (PPB):	6.369 lbs / yr
Total Phosphorous Mitigation Credit (SEC + STC):	0.00 lbs / yr
Total Pre-treatment Phosphorus Export (Pre-PPE):	0.00 lbs / yr
Total Post-treatment Phosphorous Export (Post-PPE):	6.368 lbs / yr
Project Phosphorus Export:	6.368 lbs / yr
Level of Control:	adequate

#### **Conditons**

**Proposed Condition:** The applicant will retain the services of a professional engineer to inspect the construction and stabilization of the road ditch turnouts to be built on the site. Inspections shall consist of weekly visits to the site to inspect each turnout construction, turnout's stone berm material and placement, from initial ground disturbance to final stabilization of the level spreader. If necessary, the inspecting engineer will interpret the turnout's location and construction plan for the contractor. Once the turnouts are constructed and stabilized, the inspecting engineer will notify the department in writing within 14 days to state that the turnouts have been completed. Accompanying the engineer's notification must be a log of the engineer's inspections giving the date of each inspection, the time of each inspection, the items inspected on each visit, and include any testing data or sieve analysis data of the berm media.

**Proposed Condition:** The applicant will retain the services of a professional engineer to inspect the construction and stabilization of the stone bermed level spreaders to be built on the site. Inspections shall consist of weekly visits to the site to inspect each level spreaders construction, stone berm material

and placement, settling basin from initial ground disturbance to final stabilization of the level spreader. If necessary, the inspecting engineer will interpret the stone bermed level lip spreader's location and construction plan for the contractor. Once the stone bermed level lip spreaders are constructed and stabilized, the inspecting engineer will notify the department in writing within 14 days to state that the level lips have been completed. Accompanying the engineer's notification must be a log of the engineer's inspections giving the date of each inspection, the time of each inspection, the items inspected on each visit, and include any testing data or sieve analysis data of the berm media.

**Proposed Condition:** The applicant will retain the services of a professional engineer to inspect the construction and stabilization of the grassed underdrained soil filters to be built on the site. Inspections shall consist of an appropriate number of visits to the site to inspect the underdrained soil filter's underdrain construction, filter material placement and compaction, fabric layment, and stormwater overflow bypass construction from initial ground disturbance to final stabilization of the filter. If necessary, the inspecting engineer will interpret the filter's location and construction plan for the contractor. Once the filter is constructed and stabilized, the inspecting engineer will notify the department in writing within 14 days to state that the filter has been completed. Accompanying the engineer's notification must be a log of the engineer's inspections giving the date of each inspection, the time of each inspection, the items inspected on each visit, and include any testing data or sieve analysis data of the filter media. An inspection of the grassed underdrained soil filter shall also be performed by a professional engineer one year after the final stabilization of the filter. The engineer will notify the department as to the filter's effectiveness and determine any maintenance items that are needed.

Approval recommended for this section.

#### **FLOODING STANDARDS**

The applicant has provided an analysis of the watersheds involved in this project for flooding. The nature of linear project creates relatively little impervious area in any one sub watershed and as such the applicant has looked at the impact on the wider watershed area. By looking at the impact on just the watershed's curve number (the first step in the typical TR20 or TR55 analysis) we can see the relative change in the watershed by flooding. This is also acceptable since the goal of the applicant has been to turn out or buffer as much of the road impacts as possible. This creates a large amount of disconnected impervious area, keeps flows from exiting the site in concentrated flow, and lengthens the flow path in a manner that will mitigate for local flooding impacts.

Approval recommended for this section.

#### **MAINTENANCE:**

NOTE: The applicant and contractor will be responsible for the maintenance of all proposed stormwater management structures, i.e. ponds, swales, culverts and discharge outlets during construction. Thereafter, each stormwater management structure should be cleaned and cleared of debris yearly at a minimum. Sweeping of all pavements is recommended on an annual basis. The DEP may request to inspect the site at a future date.

#### **DESIGN REVIEW RESPONSIBILITY**

This review only ensures that the proposed plan is meeting the minimum standards set by the department for erosion control management and for stormwater management. It does not guarantee that the design is appropriate for the level of work suggested and for the functionality of the facility.

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